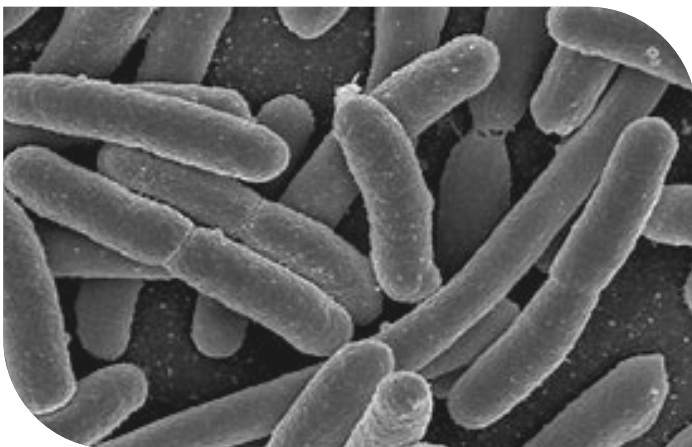


# Coliform Bacteria in Groundwater

Coliform bacteria are microorganisms that are commonly found in the digestive tract of warm-blooded animals, including humans, and are used as an indicator of potential contamination in water supplies. In groundwater, the presence of coliform bacteria can indicate that the water has been contaminated with human or animal waste, which can contain harmful pathogens.

It is important to note that not all coliform bacteria are harmful, but their presence in groundwater can indicate the potential presence of harmful pathogens. Further testing is typically needed to determine the exact cause of contamination and the level of risk to public health.

Regular monitoring and testing of groundwater for coliform bacteria is essential to ensure it is safe for human consumption and use (Colford et al., 2006). In the event of contamination, treatment and remediation processes can be implemented to reduce the levels of coliform bacteria and other harmful pathogens in the water.



## Health Impacts

The presence of coliform bacteria in groundwater is a significant public health concern since contaminated water can cause serious illnesses if consumed or used for hygiene purposes.

The presence of coliform bacteria in groundwater can indicate the presence of more harmful pathogens, such as *E. coli* and *Salmonella*. These pathogens in groundwater can cause:

- Gastrointestinal illness with symptoms of nausea, vomiting, and diarrhea. These illnesses can be life-threatening, especially for vulnerable populations such as older adults, young children, and people with compromised immune systems.
- Bacterial infections of the skin and soft tissue, urinary tract, and lungs (pneumonia)
- Increased risk to people with compromised immune systems and individuals who are pregnant
- Waterborne diseases such as cholera, typhoid fever, and dysentery

Monitor groundwater for the presence of coliform bacteria and take steps to reduce exposure if levels are high. Options include:

- Treating the water
- Finding alternative water sources
- Taking other protective measures as recommended by public health officials

Determining the source of the fecal coliform contamination in water systems is important since repairs and/or modifications might be needed to prevent recontamination after water treatment.

## Treating Coliform Bacteria in Groundwater

Coliform bacteria in groundwater can be treated through:

- **Disinfection:** The most common method used to treat groundwater contaminated with coliform bacteria. This method can be done using chemicals such as chlorine, chloramines, or ozone. The water is treated with a specific dose of the chemical and then left to stand for a certain amount of time to allow for adequate disinfection.
- **Ultrafiltration:** A method that uses a membrane to filter out bacteria and other impurities from the water. This method is effective for reducing coliform bacteria levels in groundwater and is commonly used in conjunction with other treatment methods.
- **Reverse osmosis:** Uses a semipermeable membrane to filter out impurities, including bacteria, from the water. This method is effective for reducing coliform bacteria levels in groundwater, but can be expensive and might require a significant amount of water to be wasted during the filtration process.
- **UV light:** Used to treat water to reduce coliform bacteria levels. This method involves running the water through a UV light treatment unit, which uses UV light to kill the bacteria.
- **Boiling:** Boiling water is an effective method for reducing coliform bacteria levels. The water should be brought to a rolling boil for at least 1 minute to ensure that all bacteria are killed.
- **System Maintenance:** Repairs or maintenance of system components might eliminate the source of contamination.

The most effective method will depend on the specific situation, including the coliform bacteria level, the groundwater chemistry, and the needs and preferences of the homeowner (California State Water Resources Control Board, 2018).

A water treatment professional can help determine the best treatment option for a specific private well.

### Recommended Resources

- Well Testing | Centers for Disease Control and Prevention

### Tips to Maintain a Healthy Well

- **Know** your private well and take pictures of the following to reference later if there is damage:
  - Storage or pressure tanks
  - Pump
  - Treatment system, including filters
  - Electrical components
- **Know** your well depth and pump setting if using a submersible pump.
- **Test** your water annually for coliform and nitrate, and every 3–5 years for a complete analysis to determine if there have been any changes to the water quality.
- **Check** your private well periodically for any damage or maintenance problems. Always hire a qualified professional well contractor to service your well.
- **Keep** the contact information for a licensed well contractor, local health department, university extension service, licensed electrician, and water testing laboratory handy.

- Protect Your Home's Water | U.S. Environmental Protection Agency
- Bacterial Indicators | California State Water Resources Control Board

### References

- California State Water Resources Control Board. (2018). Title 22, California Code of Regulations, Regulations Related to Drinking Water.
- Colford, J. M., Jr, Roy, S., Beach, M. J., Hightower, A., Shaw, S. E., & Wade, T. J. (2006). A review of household drinking water intervention trials and an approach to the estimation of endemic waterborne gastroenteritis in the United States. *Journal of Water and Health*, 4 Suppl 2, 71–88. <https://doi.org/10.2166/wh.2006.018>